

Study programmes: BACHELOR STUDIES - Mathematics			
Course name: Probability and statistics B			
Lecturers: Pavle N. Mladenović			
Status: Compulsory for modules ML, MM, MR, MP and MA			
ECTS: 5			
Attendance prerequisites: No prerequisites.			
Course aims: Getting familiar with limit theorems of probability theory, basic concepts and typical problems of mathematical statistics, important distributions of mathematical statistics and possibilities of application methods of probability theory and mathematical statistics.			
Course outcome: The student got knowledge of the basic limit theorems of probability theory, basic concepts of mathematical statistics and is capable of applying the methods of probability theory and mathematical statistics in various researches.			
Course content: Characteristic function (definition, examples, properties). Bijection between probability distributions and characteristic functions and inversion formula for characteristic function. Convergence in probability. Borel-Cantelli lemma and almost sure convergence. Convergence in square mean. Convergence in distribution (connection with characteristic functions). Relationship between various types of convergence. Strong law of large numbers. Central limit theorem. Statistical model and task of mathematical statistics. Population, variable, sample. Order statistics. Empirical distribution function. Sample mean and sample variance and their numerical characteristics. Chi-squared distribution. Joint distribution of sample mean and sample variance for sample from normal distribution. T-distribution. Consistent estimators. Unbiased estimators. Comparison of estimators and Rao-Cramer inequality. Maximum likelihood method. Confidence interval for probability of binomial distribution. Confidence interval for mathematical expectation of normal distribution. Confidence interval for variance of normal distribution. Statistical hypothesis testing. Critical region. Level of significance. Power of a test. Neyman-Pearson lemma. Testing hypothesis about parameters of normal distribution. Pearson's chi-squared test.			
Literature:			
<ol style="list-style-type: none"> 1. Pavle Mladenović: Elementaran uvod u verovatnoću i statistiku, Društvo matematičara Srbije, Beograd, 2001. 2. Pavle Mladenović: Verovatnoća i statistika, četvrto izdanje, Matematički fakultet, Beograd, 2008. 3. J. Vukmirović i P. Mladenović: Teorija verovatnoća, zadaci i problemi, Beograd, 2013. 			
Number of hours: 4	Lectures: 2	Tutorials: 2	Laboratory: -
Research: -			
Teaching and learning methods: Frontal / Tutorial			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	-	Written exam	-
Exercises / Tutorials	10	Oral exam	40
Colloquia	40	Written-oral exam	-
Essay / Project	10		